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Title: AN IMPROVEMENT IN COMPRESSION JOINTS ;

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Inventor(s): ;

Applicant(s): PARAGON PLASTICS LTD ;

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IPC Classification: F16L19/06 ;

Equivalents: ;

ABSTRACT:

A compression joint including male and female screwthreaded members (10 and 12), a ferrule (18) and an O-ring (28), the female member (12) having a tapered bore portion within which a tapered portion of the ferrule (18) is fitted and the male member (10) having a counterbore portion (22) within which the O-ring is accommodated, the arrangement being such that when the male and female screw-threaded members are tightened together the ferrule is inwardly compressed to tightly embrace a tube or tubular connecting piece on which the joint has been fitted. In order that the ferrule (18) can be retained concentrically within the joint before it has been fitted on a tube or tubular connecting piece, the ferrule is provided with a tubular spigot portion (24) which can be entered into the mouth of the counterbore portion (22).

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(54) **An improvement in compression joints**

(57) A compression joint including male and female screwthreaded members (10 and 12), a ferrule (18) and an O-ring (28), the female member (12) having a tapered bore portion within which a tapered portion of the ferrule (18) is fitted and the male member (10) having a counterbore portion (22) within which the O-ring is accommodated, the arrangement being such that when the male and female screw-threaded members are tightened together the ferrule is inwardly compressed to tightly embrace a tube or tubular connecting piece on which the joint has been fitted.

In order that the ferrule (18) can be retained concentrically within the joint before it has been fitted on a tube or tubular connecting piece, the ferrule is provided with a tubular spigot portion (24) which can be entered into the mouth of the counterbore portion (22).

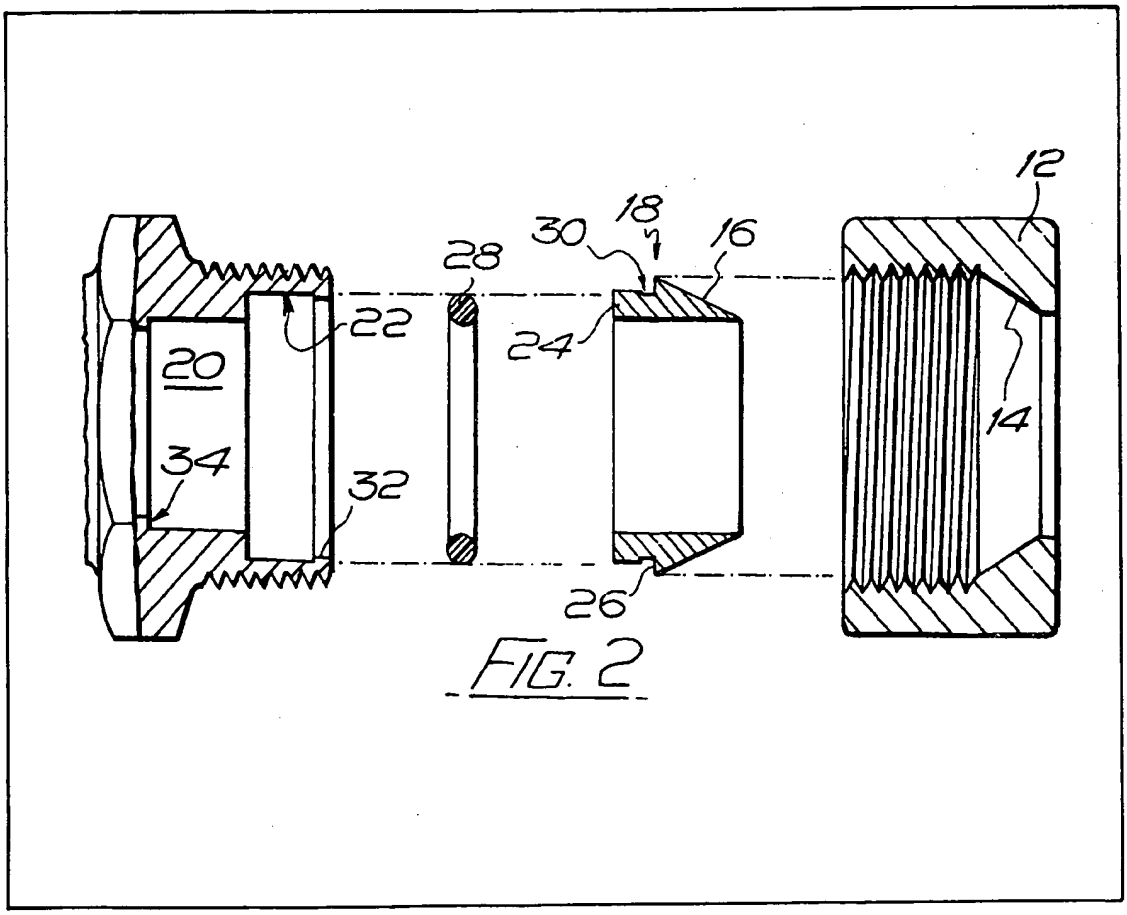


FIG. 2

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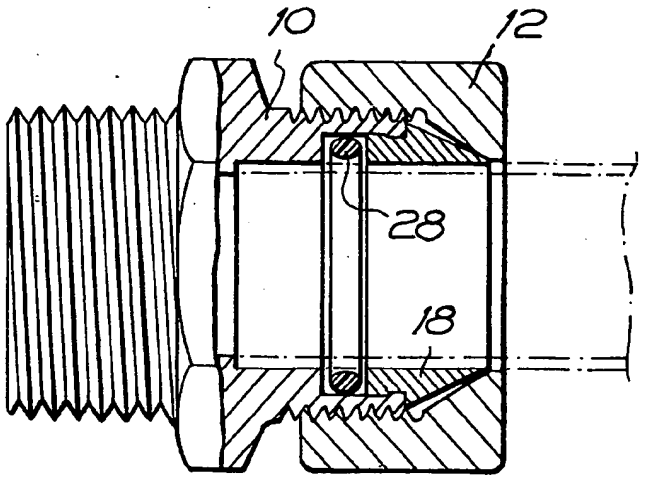


FIG.1

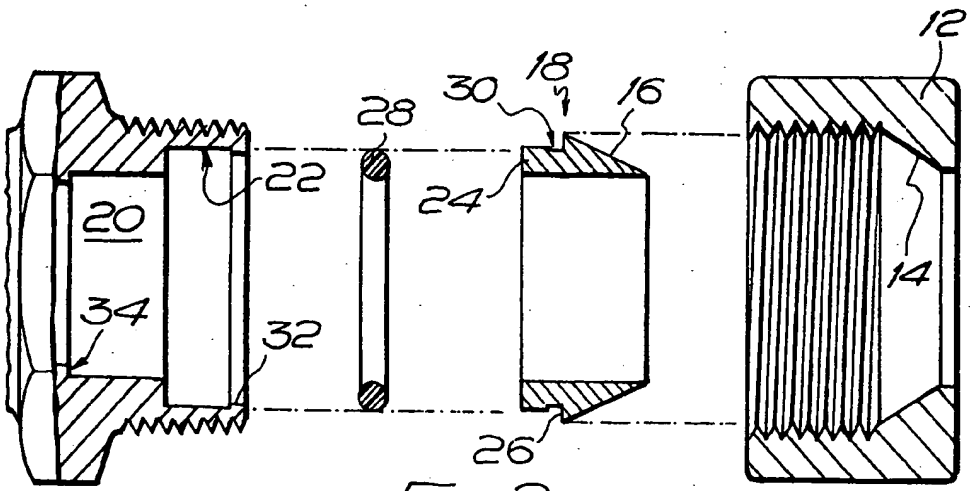


FIG. 2

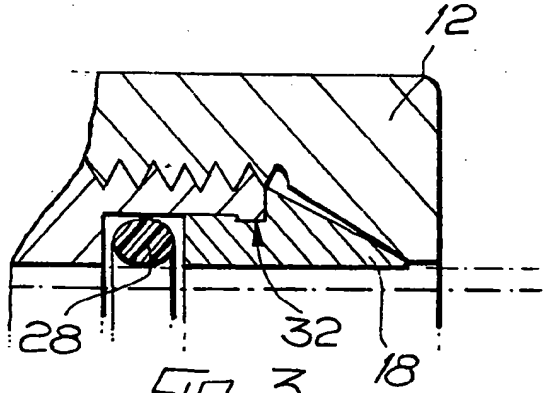


FIG. 3

SPECIFICATION

**An improvement in compression joints**

The invention relates to compression joints and has for its object to provide an improvement therein.

It has previously been known to provide a compression joint which provides both a mechanical joint, by virtue of the inward compression of a ferrule on a tube or tubular connecting piece, and a leak-proof seal against the leakage of fluid from the joint by virtue of the presence of an O-ring seal. Such previously known compression joints have been found to be particularly advantageous in forming a leak-proof seal when the tube or tubular connecting piece has been a weak walled tube because in such a case it has often been found that a purely mechanical joint which has attempted to perform the dual function of a leak-proof seal has not been successful, particularly when used in hot water systems. It has been found that when the fluid sealing function and the mechanical connecting function have been effected separately, a relatively weak walled tube or tubular connecting piece has not been crushed inwardly to any large extent by the ferrule and only sufficient clamping pressure need be applied to hold the component parts firmly together.

In one such known arrangement including male and female screwthreaded members, the female screwthreaded member is provided with a portion having a tapered bore within which the ferrule, having a complementary external taper, can be fitted before the screwthreaded members are connected together, the arrangement being such that when the two screwthreaded members have been fitted together the male member bears against the end of the ferrule to urge it against the tapered bore within the female member so that the ferrule is inwardly compressed to tightly embrace a tube or tubular connecting piece which has been entered into a bore in the male screwthreaded member, the end of said male screwthreaded member which is to abut against the end of the ferrule having a counterbore which forms a groove for the reception of the O-ring seal, one wall of said groove being formed by a radially inner part of the end surface of the ferrule against which the end of the male screwthreaded member is to bear. Such previously known compression joints have been found to be generally satisfactory in use. However, one difficulty which has been found is that during assembly the ferrule is loosely contained within the tapered bore portion of the female screwthreaded member and this has necessitated the male and female screwthreaded members being disconnected to allow the component parts to be passed in turn over the tube or tubular connecting piece upon which the compression joint is to be applied. Consequently, it is the object of the invention to at least alleviate this difficulty.

According to one aspect of the invention, there is provided a combination of parts for making a compression joint and including male and female screwthreaded members, a ferrule and an O-ring seal, the female screwthreaded member having a portion with a tapered bore within which the ferrule, having at one end a complementary or substantially complementary externally tapered portion, can be fitted before the screwthreaded members are connected together and the male screwthreaded member having a bore and a counterbore portion within which can register a tubular spigot portion formed at the end of the ferrule remote from its externally tapered end, the arrangement being such that when the two screwthreaded members are tightened together the male member bears against an annular shoulder intermediate the ends of the ferrule to urge its tapered end portion against the tapered bore within the female member so that the tapered end of the ferrule is inwardly compressed to tightly embrace a tube or tubular connecting piece which has been entered into the bore in the male screwthreaded member, an innermost portion of the counterbore in said male screwthreaded member forming a groove for the reception of the O-ring seal, one wall of said groove being formed by the end surface of the tubular spigot portion of the ferrule. The tubular spigot portion of the ferrule will preferably be a snap fit in the counterbore portion of the male screwthreaded member and for this purpose the tubular spigot portion will preferably have a shallow groove, adjacent the shoulder intermediate its end for engagement by an interned annular bead or by a plurality of inturned elements formed at the mouth of the counterbore portion of the male screwthreaded member. The bore in the male screwthreaded member will preferably be a stepped bore so that when a tube or tubular connecting piece has been entered into said bore the bore of the tube or tubular connecting piece, as the case may be, is continuous with the reduced diameter portion of the bore in said male screwthreaded member. At least the ferrule may be made of a synthetic plastics material. The screwthreaded member may be double ended for forming two compression joints. On the other hand it may be formed integrally with a fitting to which a tube or tubular connecting piece is to be connected.

According to another aspect of the invention, there is provided an assembled compression joint made by a combination of parts as described above.

In order that the invention may be fully understood and readily carried into effect, the same will now be described, by way of example only, with reference to the accompanying drawings, in which:—

Fig. 1 is a part-sectional view through a compression joint embodying the invention,

Fig. 2 is an exploded view which better illustrates the component parts of the joint, and

Fig. 3 is a detail view, drawn to a somewhat enlarged scale, which will presently be referred to.

Referring now to Fig. 1 of the drawings, the compression joint there illustrated includes male and female screwthreaded members 10 and 12, the female screwthreaded member 12 of which has a portion with a tapered bore 14 within which an externally tapered portion 16 of a ferrule 18 can be fitted. The male screwthreaded member 10 has a bore 20 and a counterbore portion 22 within which can register a tubular spigot 24 formed at the end of the ferrule remote from its externally tapered end.

When the compression joint is assembled as shown in Fig. 1, and the male and female screwthreaded members are tightened together, the male member bears against an annular shoulder 26 intermediate the ends of the ferrule to urge the tapered end of the latter against the tapered bore 14 within the female member so that the tapered end of the ferrule is inwardly compressed to tightly embrace a tube or tubular connecting piece (shown in chain-dotted lines in the drawings) which has been entered into the bore in the male screwthreaded member.

It will be seen that the tubular spigot portion 24 of the ferrule is of a somewhat lesser dimension than the depth of the counterbore portion 22 of the male member. Consequently, an innermost portion of the counterbore forms a groove for the reception of an O-ring seal 28, one wall of said groove being formed by the end surfaces of the tubular spigot portion of the ferrule. The tubular spigot portion of the ferrule has a shallow groove 30, adjacent the shoulder 26, for engagement by an inturned annular bead 32 formed at the mouth of the counterbore portion of the male screw-threaded member. Consequently, said tubular spigot portion is a snap-fit in said counterbore portion and retains the O-ring seal in position within the male screwthreaded member.

Thus there is provided a compression joint which provides both a mechanical joint, by virtue of the inward compression of the tapered end of the ferrule on the tube or tubular connecting piece, and a leak-proof seal against the leakage of fluid from the joint by virtue of the presence of the O-ring seal (and it should perhaps here be mentioned that in the illustrated example the angles of the tapered bore portion of the female screwthreaded member and of the externally tapered portion of the ferrule are not exactly the same, this being so that only a relatively light clamping force is necessary to effect a radial displacement of the tapered end of the ferrule for positive retention; but of course these angles could be made exactly the same if preferred). It will be seen that the arrangement is such that even without the presence of a tube or tubular connecting piece engaging the bore of the male screwthreaded member, the ferrule is maintained in alignment with said bore so that with the component parts of the joint loosely connected together it is a simple matter to slide the tube or tubular connecting piece through the female screwthreaded member, through the ferrule and along the bore of the male member into abutment with the shoulder 34 formed within the latter. (It is advantageous if the bore in the male screwthreaded member is a stepped bore so that when a tube or tubular connecting piece has been entered into said bore the bore of the tube or tubular connecting piece, as the case may be, is continuous with the reduced diameter portion of the bore of said male screwthreaded member, but of course this is not an essential requirement).

Various modifications may be made without departing from the scope of the invention. For example, instead of the mouth of the counterbore portion of the male screwthreaded member being formed with a continuous annular bead, it could be formed with a plurality of inturned elements having exactly the same function of engaging the shallow groove of the tubular spigot portion of the ferrule to ensure that the latter is a snap fit in said counterbore portion. It will be understood that although the joint has been designed for production entirely of a synthetic plastics material, any or all of its component parts could be made of metal (with the exception of the O-ring seal of course).

It will of course be understood that the tube or tubular connecting piece shown chain-dotted in Fig. 1 may be simply a plain length of tube or may be a tubular spigot portion formed on some kind of fitting, for example on a water tap or valve. It will also be understood that although in the joint illustrated by way of example the male screwthreaded member is shown to be double ended (and may of course form the male screwthreaded members of two such joints whereby for example two lengths of tube may be connected together end to end) the male screwthreaded member, that is to say the part shown in part section in Fig. 2, could also be formed integrally with some kind of fitting to which a tube or tubular connecting piece is to be connected.

CLAIMS

1. A combination of parts for making a compression joint and including male and female screwthreaded members, a ferrule and an O-ring seal, the female screwthreaded member having a portion with a tapered bore within which the ferrule, having at one end a complementary or substantially complementary externally tapered portion, can be fitted before the screwthreaded members are connected together, and the male screwthreaded member having a bore and a counterbore portion within which can register a tubular spigot portion formed at the end of the ferrule remote from its externally tapered end, the arrangement being such that when the two screwthreaded members are tightened together the male member bears against an annular shoulder intermediate the ends of the ferrule to urge its tapered end portion against the tapered bore within the female member so that the tapered end of the ferrule is inwardly compressed to tightly embrace a tube or tubular connecting piece which has been entered into the bore in the male screwthreaded member, an innermost portion of the counterbore in said male screwthreaded member forming a groove for the reception of the O-ring seal, one wall of said groove being formed by the end surface of the tubular spigot portion of the ferrule.

2. A combination of parts according to claim 1, in which the tubular spigot portion of the ferrule is a snap fit in the counterbore portion of the male screwthreaded member the tubular spigot portion having a shallow groove, adjacent the shoulder intermediate its end for engagement by an inturned annular bead or a plurality of inturned elements formed at the mouth of the counterbore portion of the male screwthreaded member.

3. A combination of parts according to either one of the preceding claims, in which the bore in the male screwthreaded member is a stepped bore so that when a tube or tubular connecting piece has been entered into said bore the bore of the tube or tubular connecting piece, as the case may be, is con-

tinuous with the reduced diameter portion of the bore in said male screwthreaded member.

4. A combination of parts according to any one of the preceding claims, in which the ferrule is made of a synthetic plastics material.

5. A combination of parts according to any one of the preceding claims, in which the screwthreaded member is double ended for forming two compression joints.

6. A combination of parts according to any one of claims 1 to 4, in which the screwthreaded member is formed integrally with a fitting to which a tube or tubular connecting piece is to be connected.

7. An assembled compression joint made by a combination of parts according to any one of the preceding claims.

8. A combination of parts substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.

9. An assembled compression joint constructed and arranged substantially as hereinbefore described with reference to and and illustrated by the accompanying drawings.

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